

Request for Continued Exam
U.S. Application S/N 09/141,964
Filed August 28, 1998
Docket No. SARA.85

I. VERSION OF PAGE 8 OF THE SPECIFICATION WITH MARKINGS

TO SHOW CHANGES MADE

U. S. Patent No. 5,086,616 "Measure Shielding Effectiveness of Enclosures"

"Monitoring Process and Device of a Quasi-Closed Electromagnet Shield" discloses a measurement system, however, the source of the radiation is retained inside the enclosure, the frequency range is limited to 1 to 100 KHz, and the source is low power.

SUMMARY OF THE INVENTION

This invention is a low-power/wideband (LPWB) transfer function measurement method and a distributed data acquisition and processing apparatus with which to perform the aforesaid method. The method uses a completely new approach in the art - Stochastic Process Test Technique (SPTT) - for deriving transfer functions and a distributed, rather than centrally located, instrumentation apparatus to manage the test process.

In the invention, an advanced stochastic processing test technique (SPTT) enables determination of transfer functions using LPWB schemes. The system is excited by being radiated with a low power pseudo-random signal that has a concentrated frequency content over a wide, continuous band (wideband). The bandwidth of this signal can be up to several thousand times larger than a CW tone. Therefore, one LPWB pulse can excite the system with the equivalent of thousands of CW tones. This has the advantage

Request for Continued Exam
U.S. Application S/N 09/141,964
Filed August 28, 1998
Docket No. SARA.85

of greatly decreasing the time required to make transfer function measurements.

Interference with other electronic devices is considerably reduced, because the low power excitation signal has a structure that is similar to noise. Since the excitation is over a continuous band, as opposed to CW which changes frequency in discrete steps, detailed transfer function information is not missed.

LPWB uses a wideband excitation baseband signal and an up-conversion process to operate at frequencies that are greater than the highest modulation frequency of the baseband. The up-conversion process shifts the baseband excitation signal upward to the various frequency

Request for Continued Exam
U.S. Application S/N 09/141,964
Filed August 28, 1998
Docket No. SARA.85

II. CLEAN VERSION OF PAGE 8 OF THE SPECIFICATION WITHOUT
MARKINGS BUT INCLUDING THE CHANGES

U. S. Patent No. 5,086,616 "Monitoring Process and Device of a Quasi-Closed Electromagnet Shield" discloses a measurement system, however, the source of the radiation is retained inside the enclosure, the frequency range is limited to 1 to 100 KHz, and the source is low power.

SUMMARY OF THE INVENTION

This invention is a low-power/wideband (LPWB) transfer function measurement method and a distributed data acquisition and processing apparatus with which to perform the aforesaid method. The method uses a completely new approach in the art - Stochastic Process Test Technique (SPTT) - for deriving transfer functions and a distributed, rather than centrally located, instrumentation apparatus to manage the test process.

In the invention, an advanced stochastic processing test technique (SPTT) enables determination of transfer functions using LPWB schemes. The system is excited by being radiated with a low power pseudo-random signal that has a concentrated frequency content over a wide, continuous band (wideband). The bandwidth of this signal can be up to several thousand times larger than a CW tone. Therefore, one LPWB pulse can excite the system with the equivalent of thousands of CW tones. This has the advantage

Request for Continued Exam
U.S. Application S/N 09/141,964
Filed August 28, 1998
Docket No. SARA.85

of greatly decreasing the time required to make transfer function measurements.

Interference with other electronic devices is considerably reduced, because the low power excitation signal has a structure that is similar to noise. Since the excitation is over a continuous band, as opposed to CW which changes frequency in discrete steps, detailed transfer function information is not missed.

LPWB uses a wideband excitation baseband signal and an up-conversion process to operate at frequencies that are greater than the highest modulation frequency of the baseband. The up-conversion process shifts the baseband excitation signal upward to the various frequency

Request for Continued Exam
U.S. Application S/N 09/141,964
Filed August 28, 1998
Docket No. SARA.85

III. VERSION OF PAGE 13 OF THE SPECIFICATION WITH MARKINGS

TO SHOW CHANGES MADE

wideband excitation; a method of measuring transfer functions with an indication of measurement quality; a method of measuring transfer functions with the capability of rejecting corrupted data; a method of measuring transfer function under conditions where environmental (ambient) excitation can be utilized; a method of measuring transfer functions without interfering with other electronic devices; a method of measuring transfer function without causing a health risk; a method of measuring transfer functions over wide bandwidths without measuring one individual frequency at a time; and a method for implementing a modular distributed instrumentation architecture.

Still further objects of this invention are an unique general purpose physically distributed apparatus for using low-power, wideband radiation to excite a system and determining system's responses to the excitation; comprised of a waveform synthesizer, for transmitting the input low-power wideband radiation to excite a system; multiple receivers, for measuring the system input and output; a digital computer, for controlling the waveform synthesizer and receiver operations and calculating the system characterizations, such as system transfer functions, from the measured data; and a digital fiber optics telemetry system to facilitate communication and synchronization between

Request for Continued Exam
U.S. Application S/N 09/141,964
Filed August 28, 1998
Docket No. SARA.85

the physically distributed waveform synthesizers, receivers, and the computer.

These and other objects of the invention may be determined by reading the description of the preferred embodiments along with the drawings attached thereto. The scope of protection sought by the inventor may be gleaned from a fair reading of the claims that conclude this specification.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a schematic diagram showing the general layout of a transfer function;

Request for Continued Exam
U.S. Application S/N 09/141,964
Filed August 28, 1998
Docket No. SARA.85

IV. CLEAN VERSION OF PAGE 13 OF THE SPECIFICATION WITHOUT
MARKINGS BUT INCLUDING THE CHANGES

wideband excitation; a method of measuring transfer functions with an indication of measurement quality; a method of measuring transfer functions with the capability of rejecting corrupted data; a method of measuring transfer function under conditions where environmental (ambient) excitation can be utilized; a method of measuring transfer functions without interfering with other electronic devices; a method of measuring transfer function without causing a health risk; a method of measuring transfer functions over wide bandwidths without measuring one individual frequency at a time; and a method for implementing a modular distributed instrumentation architecture.

Still further objects of this invention are an unique general purpose physically distributed apparatus for using low-power, wideband radiation to excite a system and determining system's responses to the excitation; comprised of a waveform synthesizer, for transmitting the input low-power wideband radiation to excite a system; multiple receivers, for measuring the system input and output; a digital computer, for controlling the waveform synthesizer and receiver operations and calculating the system characterizations, such as system transfer functions, from the measured data; and a digital fiber optics telemetry system to facilitate communication and synchronization between

Request for Continued Exam
U.S. Application S/N 09/141,964
Filed August 28, 1998
Docket No. SARA.85

the physically distributed waveform synthesizers, receivers, and the computer.

These and other objects of the invention may be determined by reading the description of the preferred embodiments along with the drawings attached thereto. The scope of protection sought by the inventor may be gleaned from a fair reading of the claims that conclude this specification.